SCIENCE

FRIDAY, SEPTEMBER 30, 1887.

IN A RECENT NUMBER of *Science* (x. No. 240) we had occasion to refer to the beneficent law now existing in several of the States, prohibiting the employment of color-blind persons on the railroads of those States, and instanced Massachusetts as the first one to enact such a law. At a meeting of the Brotherhood of Locomotive Engineers, just held in Boston, at which three thousand railroad-engineers were said to be present, one of the speakers who addressed the audience was received with great applause, because, as the chairman said in introducing him, "he secured the repeal of the obnoxious color-blind law," — a questionable honor, if true; but, from the best information which we are able to obtain, the law still exists, although it has been modified in a manner which in no wise weakens, but, on the contrary, rather strengthens, its practical working. It is not to be wondered at that railroad employees object to a test of their qualifications which may result in the loss of their positions, but we imagine that any attempt to repeal the law would meet with the determined opposition of the entire travelling public. The single instance which occurred in Connecticut, where twenty-one railroad employees were found wholly color-blind, is sufficient proof of the necessity of such a law, and, instead of endeavoring to repeal existing laws, a strong and continuous effort should be made to extend their provisions to other States.

DISTILLERY-MILK REPORT. — V.

THE attempt which *Science* has made to obtain facts and opinions in reference to the effect of distillery-swill upon the animals to which it was fed, both as to their health and the wholesomeness of the milk secreted by them, has been measurably successful. As was to have been anticipated, the opinions greatly outnumber the facts. To any one who has had experience in similar inquiries this will be a matter of no surprise. The difficulties surrounding a mathematical demonstration of a problem so intricate as this are well-nigh insurmountable, unless a thorough investigation is made by skilful and competent men with all the necessary means at their disposal. The fact that such an inquiry into the matter under consideration has never been made, is very evident from a perusal of the replies which *Science* has received from its correspondents. These replies show that medical and other professional men are divided as to the effect of swill-milk upon human beings, although those who regard it as unwholesome food, and as injurious to those who consume it, greatly preponderate. The evidence seems also to point to the conclusion that when distillery-swill is fed to cows in connection with other food, and the cows kept in properly ventilated and clean stables, with a sufficient amount of exercise in the open air, it is not injurious to these animals. But, on the other hand, it likewise appears, that as ordinarily fed to animals that are confined continuously in close and filthy stables, without admixture with other food, the consequences, both to the animals themselves and to their secretion, are most pernicious.

The lack of definite knowledge on a subject of such vital interest is greatly deplored by those who have expressed themselves on this point, and it would seem that the time has come for a thorough investigation into the question at issue. Until within a few years, such an inquiry could only have been made by individuals or by societies, in much the same manner as was undertaken by the New York Academy of Medicine in 1858. It is manifest that the results to be obtained in this way, valuable as they are for some purposes, cannot definitely settle the question so as to satisfy the minds of all. If the experimental stations established by both the national and State governments cannot take up an issue of such general importance as this, it is very much to be regretted. Believing, however, that such is their legitimate work, we shall endeavor, by every means in our power, to bring about this desirable action on the part of the stations, and would solicit the assistance, in the accomplishment of this end, of all who have the necessary influence. We shall also take the liberty of suggesting the general plan upon which such an investigation should be carried out. This we do with the greater assurance, because we have received most valuable suggestions from Professors Law and Brewer, and Drs. Sturtevant, Newton, Salmon, and other authorities, with whom we are in perfect accord.

One suggestion made by Professor Brewer, would, if carried into practice, be a crucial experiment. He says, "If you can convince a few orphan-asylums and foundling-hospitals that it would be an innocent and harmless experiment to feed half of their children on distillery-swill milk, and the other on grass-and-grain milk, and continue this experiment for several years, on different races of children, in different localities, some of the swill-milk stables to be kept as clean as other stables may be, by some process not yet announced, and carefully record and collate all the results, the question would then be settled, in the usual acceptance of that term." The impracticability of such a plan no one appreciates better than Professor Brewer. He therefore adds, "Until some such plan for 'positive evidence' be secured, I suggest that you work at the method of cumulative evidence, which has been so rich in conclusions and beneficent in its results in other departments of sanitary science."

There appears to be some difference of opinion as to the exact chemical composition of distillery-swill, under different circumstances; so that in carrying out any experiments the following points, as suggested by Professor Law, should be ascertained and recorded: (1) Is the swill fresh? (2) Has it undergone any other than the alcoholic fermentation? (3) Is it uniform in quality as supplied from day to day? (4) At what heat is it fed? (5) Does it contain the simple original grain-products, — gluten, salts, etc., — or has there been added any chemical agent used in the manufacture of the alcoholic liquid? These inquiries are necessary, because the effect of swill when fresh may be entirely different from swill in an acid or decomposed state, and the allegation has also been made that injurious chemical agents are added. The temperature of the stables in which the experimental animals are housed should also be recorded. In short, every condition which is liable to enter as a factor into the problem should be intelligently regarded. Dr. Salmon advises that biological analyses of the milk should be made, in order to determine the relative number of germs as compared with milk from country pastures.

Hitherto chemical analysis has been mainly relied on in determining the quality of the milk; but, as Dr. Sturtevant remarks, "while this is of assistance, it cannot alone determine the questions relative to healthfulness. The question should be investigated from the chemico-physiological standpoint: determine whether substances not met with in ordinary foods can be traced through the animal to the milk; whether bacterial germs exist in the food, and whether such can be traced through the animal to the milk; whether animals of a delicate nature will succumb, or show indication of disease, when fed with suspected milk, while other individuals thrive upon a milk considered of a fine quality. The development of ptomaines in feeding substances through neglect of proper precaution should also receive investigation, as a food otherwise useful may at times become dangerous on the neglect of ordinary precaution."

Dr. Salmon does not regard the studying of milk from healthy cattle, fed upon swill under favorable hygienic conditions, as of much value towards elucidating the practical questions involved. "The question," he says, "is not, whether a small quantity of cool